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Dispositions and Habituals

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1. Introduction

Objects have dispositions. As Nelson Goodman put it, "a thing is full of threats and promises" (Goodman 1954, p. 40). But sometimes those threats go unfulfilled, and the promises unkept. Sometimes the dispositions of objects fail to manifest themselves, even when their conditions of manifestation obtain. Pieces of wood, disposed to burn when heated, do not burn when heated in a vacuum chamber. And pastries, disposed to go bad when left lying around too long, won't do so if coated with lacquer and put on display in a baker's window. Any account of what a disposition is, or of what it takes for an object to have a disposition, should be compatible with these commonplace observations. To date, I believe, no adequate account of dispositions has been given, and the aim of this paper is to defend one.

The need for a correct account of dispositions is urgent in philosophy. For just about every concept that philosophers have been interested in, there are some who hold a so-called "dispositional analysis" of that concept. Among the most well known are dispositional analyses of meaning, offered in response to Kripke's presentation of Wittgenstein's skeptical challenges (Kripke 1982), and dispositional accounts of the mental in the form of versions of behaviourism and functionalism. But there are also dispositional analyses of the colors (McGinn 1983); of value (Lewis 1989); of goodness (Smith 1994); of "stimulus meaning" (Quine 1960); of properties (Shoemaker 1980); and of conditionals (Mellor 1993). Advocates of these various analyses have offered arguments in support of them, and their opponents have responded with counterarguments. But as Mark Johnston has emphasized with regard to the particular case of dispositional theories of the colors, care should be taken when adjudicating these arguments (Johnston 1992). For a dispositional theory may wrongly be taken to be mistaken

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while the real mistake lies in a misunderstanding of the dispositional vocabulary employed by that theory. We need an account of dispositions before we can confidently assess dispositional analyses of one or another philosophically problematic concept.

What exactly should an "account of dispositions" aim to achieve? There is no shortage of questions about dispositions that we might be concerned to address. Are dispositions causally relevant to their manifestations, or are they instead idle bystanders, epiphenomenal properties that are perhaps better explained away, reduced to something more scientifically respectable? Are dispositions identical with their so-called "categorical bases", those microphysical properties that "ground", "support" or "sustain" the dispositions? Can there be bare dispositions, entirely lacking in categorical bases? Are dispositions intrinsic properties of their bearers? These are interesting questions. But it would be premature, I think, to try to answer them in the absence of a general account of what is required for an object to have a disposition. Without such an account, trying to answer the question of (say) whether there can be bare dispositions is somewhat like trying to tell if a commodity is valuable in these parts without knowing what's in demand; you might have some vague intuition, but you would be unwise to proceed with confidence. The purpose of this paper, then, is to give an account of what in general is required for an object to have a disposition.

Perhaps we should begin by trying to differentiate dispositions from other kinds of properties; only once we know which properties the dispositions are, it might be thought, will we be able to come up with a general account of what it takes for an object to have one. It is easy to give a relatively uncontroversial list of dispositions—fragility, solubility, malleability, combustibility...; but it would be futile to hope to make this list complete. We should try, instead, to say what the membership conditions are for such a list. What is it about a property that makes it a *disposition*, as opposed to something else? Alternatively, what is it about certain *predicates*, like "fragile" or "soluble", in virtue of which they express dispositions rather than properties of some other kind?

This question is typically answered in the literature by saying that a predicate expresses a disposition iff the application of the predicate to an object entails a conditional of some kind. Of the statement that a certain glass is brittle, for example, David Armstrong says, "It is uncontroversial that [it] entails a counterfactual statement along these general lines: If this glass had been suitably struck, then this striking would have caused the glass to shatter" (Armstrong et al. 1996, p. 15). That may be so, or it may not; but it will hardly help differentiate the dispositional from the non-dispositional. For the application of *any* predicate to an object entails a conditional along *some* general lines, if only for the trivial reason that there are conditionals that are true as a matter of necessity.

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In response to complaints (given on different grounds) by D. H. Mellor that the view that conditional-entailing attributions are attributions of dispositions requires every predicate to express a disposition (Mellor 1974), some have argued that it is only the dispositional predicates that have corresponding to them conditional sentences that are *analytically* or *conceptually* entailed by applications of those predicates.[1] This is a more promising proposal. It is presumably in virtue of the meaning of the predicate "brittle" that objects to which it applies bear some non-trivial relation to possible events of striking and shattering, while it is in virtue instead of extralinguistic facts that the same holds of the non-dispositional predicate "thin, cold and made of glass". Nevertheless, this proposal—that a predicate is dispositional iff its application analytically entails a corresponding conditional—still requires an account of what it is for a conditional to "correspond" to a predicate. Fragility has something to do with breaking and striking or dropping; irascibility has something to do with anger and provocation—facts like these are known by any competent speaker of English. But these facts seem neither sufficiently clear nor sufficiently general to sustain the proposed distinction between dispositional and other predicates.

In giving my account of dispositions, I intend to solve this problem by bypassing it altogether. I said that I will be concerned with giving an account of what in general is required for an object to have a disposition. In other words, I intend to answer the question, What are the conditions that must be satisfied if an object is to have a disposition? In the formal mode, this is just the question, What are the conditions under which attributions of dispositions to objects are true? And now that we are speaking of attributions and their truth, instead of properties and their possession, we can regiment a little. Let us reserve the name *disposition ascription* for any sentence of the form:

N is disposed to M when C,

where "N" is to be replaced by a noun phrase, "M" by a verb phrase, and "C" by a sentence.[2] Then our question, "What are the conditions that must be satisfied if an object is to have a disposition?" has become the question, "What are the truth conditions of disposition ascriptions?". An "account" of dispositions should answer this question.

The paper will proceed as follows. I will begin, in negative fashion, by arguing that accounts which state the truth conditions of disposition ascriptions in terms of conditionals, accounts which have been popular at least since Ryle (1949), are mistaken. The recent literature on dispositions has yielded a number of subtle refinements to conditional accounts, attempts to save them from the kinds of counterexamples that I will raise at the beginning of this paper. I will argue, however, that these attempts fail, on the

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ground that no conditional account can reflect the fact, alluded to at the outset, that dispositions may fail to become manifest even when their conditions of manifestation obtain. I will go on to defend an entirely new account of the truth conditions of disposition ascriptions, arguing that we should avail ourselves of *habitual* sentences. These sentences, unlike conditionals, are perfectly suited to the task of accounting for dispositions; or so I will argue.

2. Conditional accounts

It seems fairly clear that disposition ascriptions have something to do with conditionals. To call a piece of salt disposed to dissolve when put in water, for example, is not just to say something about how the piece of salt in fact behaves; it is to say something about how it would or will behave if you put it in water. Similarly, if we're told not to drop the china because it would break if we did, it seems reasonable to infer that the china is disposed to break when dropped. One account of the truth conditions of disposition ascriptions, what I will call the *simple conditional account*, generalizes these remarks into an equivalence between disposition ascriptions and conditionals:[3]

> *N* is disposed to *M* when *C* iff, if *C* then *N M*s.

There is a question about what kind of conditional is being used on the right-hand side of the simple conditional account. As Carnap (1936) and many others since have pointed out, it is surely not a material conditional: a rock isn't disposed to dissolve when put in water just because it is never put in water. I will follow many in taking the conditional to be a counterfactual, but as will become apparent, not much of what I say will rest on this assumption.

It is now widely agreed that the simple conditional account is mistaken. There are examples which apparently show both that a disposition ascription can be false of an object while its corresponding conditional is true, and that a disposition ascription can be true of an object while its corresponding conditional is false.[4] C. B. Martin (1994) provides us with a pair of examples to show that the following biconditional fails in both directions:

> The wire is disposed to conduct electricity when touched by a conductor iff the wire would conduct electricity if it were touched by a conductor.[5]

Martin points out that there could be a wire which, although dead, and so not disposed to conduct electricity, is connected to an *electro-fink*, a device which (reliably) senses when the wire is about to be touched by a conductor, and which makes the wire conduct electricity in every such circumstance.

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If the wire were touched by a conductor then, thanks to the work of the electro-fink, the wire would become live, and so would conduct electricity: the right-hand side of Martin's biconditional is true, while the left-hand side is false. The electro-fink can also operate on a reverse cycle, attaching to naturally live wires but causing them to become dead if ever they are touched by a conductor.[6] In this case, although the wire is disposed to conduct electricity when touched by a conductor, the fink ensures that the corresponding conditional is false.

Like many others, I take this kind of example to show that the simple conditional account is just wrong. For consider what it would take to resist the example. One would have to insist that the presence or absence of an electro-fink makes an actual difference to the dispositions of a wire, not just a counterfactual one. Suppose that in its natural state the wire is not disposed to conduct electricity (it's made of rubber, say). An electro-fink is attached, making true the conditional "if the wire were touched by a conductor, it would conduct electricity". In order to save the simple conditional account one would have to defend the claim that, just by being attached to the electro-fink, the wire *gained* the disposition to conduct electricity. It is hard to imagine how this claim could be defended. Of course dispositions, like other properties, can be acquired and lost by objects over time. When we heat a wire, for example, it loses its rigidity and gains flexibility. But in such a case the wire gains and loses these dispositions in virtue of undergoing an internal, physical change. Not so in the case of the electro-fink. If, as the defender of the simple conditional account must maintain, the wire gains the disposition to conduct electricity upon being attached to the fink, then it gains that disposition without undergoing *any* internal change.

Most philosophers who write about dispositions take this to be impossible, and would probably agree with Molnar that the intrinsicness of dispositions is "one of the crucial appearances which has to be saved by an analysis" (Molnar 1999, p. 3). I believe this is a mistake (although I won't argue the point here). Objects *can*, in some circumstances, change dispositionally without changing intrinsically. Nevertheless, even if some dispositions are *not* intrinsic, there are surely constraints on the kinds of ways in which objects may extrinsically gain dispositions, and being attached to an electro-fink is one way which fails to meet those constraints. For we can imagine, if need be, that the electro-fink works by remote. We can imagine that on some distant planet there is a device, its attention focused on the dead rubber wire in front of us. Using advanced technology, the device can detect when our wire is about to be touched by a conductor, and it can quickly cause the wire to become live in such circumstances. The defender of the simple conditional account must now insist that the mere presence of this distant device, whether or not it ever in fact operates, ensures that the wire, although intrinsically just like any other rubber

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wire, is disposed to conduct electricity. And this is surely wrong. For the dispositions of objects, whether or not they depend entirely on those objects' intrinsic properties, are not due merely to the presence or absence of remote devices on faraway planets. The simple conditional account must go.

I said at the beginning of this section that there seems to be some relation between disposition ascriptions and conditionals. We have seen that this relation is not one of simple equivalence, so a natural suggestion is that a more sophisticated conditional account could be proposed. This suggestion has been pursued by a number of philosophers,[7] and is worth exploring. The best such account that I know of is given by David Lewis (1997), and it handles Martin's examples of electro-finks extremely well. Lewis's idea is to exploit the alleged intrinsicness of dispositions, or at least the intrinsicness of their causal bases. Since Martin's examples were ones in which something extrinsic to a bearer of a disposition caused that bearer to gain or lose the disposition when its conditions of manifestation obtained, Lewis's suggestion is that we include in the conditional account of disposition ascriptions a clause that blocks such troublesome cases. Here, in a simplified form, is a version of Lewis's account:

> *N* is disposed to *M* when *C* iff *N* has some intrinsic property *B* such that, if it were the case that *C*, and if *N* were to retain *B*, then *N* would *M* because *C* and because *N* has *B*.[8]

Consider now a live wire, connected to an electro-fink ensuring that if the wire were touched by a conductor it wouldn't conduct electricity. Lewis's account predicts that the wire is nonetheless disposed to conduct electricity when touched by a conductor. For the wire has an intrinsic property—the property of having free electrons, say—such that, if it were touched by a conductor, *and if it were to retain that property*, then the wire would conduct electricity (because of being touched and having the property.) It's just that Martin's electro-fink prevents the wire from retaining the intrinsic property in question.

Lewis's account also works for the case of a dead wire attached to a fink. For although the wire would conduct electricity if touched, this is due to the fink, something extrinsic to the wire, not to any of its intrinsic properties. Lewis's account therefore predicts, correctly, that the dead wire is *not* disposed to conduct electricity when touched by a conductor.

3. The problem of masking

Martin's reverse-cycle electro-fink operates by causing live wires to lose the disposition to conduct electricity (and thereby to become dead) whenever they are touched by a conductor. The fink has properties extrinsic to the wire which interfere with the wire's manifestation of a certain disposition by

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causing it to lose that disposition whenever its conditions of manifestation obtain. But this kind of extrinsic interference is not the only kind that can be imagined. Mark Johnston has called attention to cases in which objects are extrinsically prevented from manifesting a disposition not by being caused to *lose* that disposition, but rather by the manifestation itself being inhibited, or "masked".[9]

> Consider a fragile glass cup with internal packing to stabilize it against hard knocks. Packing companies know that the breaking of fragile glass cups involves three stages: first a few bonds break, then the cup deforms and then many bonds break, thereby shattering the cup. They find a support which when placed inside the glass cup prevents deformation so that the glass would not break when struck. Even though the cup would not break if struck the cup is still fragile. (Johnston 1992, p. 233)

Johnston is here considering a simple dispositional predicate, "fragile". But we can recast the example using a canonical disposition ascription instead. Johnston's glass cup has the disposition to break when struck. And it doesn't lose this disposition simply by being protected by something extrinsic to it, the packers' support structure. (After all, the support structure is there precisely *because* the cup is disposed to break when struck.) Yet, with the protective structure in place, if the glass were struck it wouldn't break. The disposition to break when struck is *masked* by the support structure, and so the simple conditional account has a false instance.

And for just the same reason Lewis's sophisticated conditional account has a false instance too. For although the cup has an intrinsic property—weak crystalline bonding, say—which (in the relevant sense) "accounts for" its disposition to break when struck, Johnston's example shows that if the cup were struck then even if it were to retain that property still it would not break (and so, *a fortiori*, it would not break because of being struck and having that property). Lewis's analysans is false while the analysandum is true.

In his brief discussion of masking, Lewis intimates that it is not clear that we should accept that there even *are* cases of masking (Lewis 1997, p. 145). In discussing an example of a poison, Lewis points out that we have a choice. We might, on the one hand, say that something is a poison iff it is disposed to cause death when ingested without its antidote; or we might say, instead, that something is a poison iff it is disposed to cause death when ingested—where this disposition can be masked by an antidote. Lewis says, correctly, that even if we take the second option, surely we would still want to say that poisonous substances have the first, more complicated disposition as well.

It is not clear, however, how this observation bears on the problem of masking. As Lewis himself is careful to point out, the question of exactly

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what the word "poison" means has little to do with a general account of disposition ascriptions. So consider the plain disposition to cause death when ingested, and forget about whether this is a disposition that all and only poisonous substances have. If I were to ingest a substance with this disposition while having previously ingested an antidote, the substance would *not* cause my death—yet it would have undergone no intrinsic change, and would still have the *disposition* to cause death when ingested.[10] It would therefore be a case of masking, and a counterexample to (even the sophisticated version of) the conditional account of disposition ascriptions.

It is worth noticing that masking is a commonplace phenomenon: dispositions of objects are being masked all the time. I'm disposed to go to sleep when I'm tired; but this disposition is sometimes masked by too much street noise. Cylinders of rubber are disposed to roll when placed on an inclined plane; but this disposition can be masked by applying a car's brakes. A piece of wood in a vacuum chamber is no less disposed to burn when heated than is its aerated counterpart (if dispositions are intrinsic properties then this *has* to be granted); but wood won't burn if heated in a vacuum. The masking of dispositions is such a humdrum occurrence that any adequate account of disposition ascriptions must accommodate it.

We should be clear, too, about just how fatal the phenomenon of masking is for conditional accounts of disposition ascriptions, or at least for those conditional accounts which employ conditionals for which *modus ponens* is a valid rule of inference.[11] Any account of disposition ascriptions which, like Lewis's, has it that, in the absence of any intrinsic change in N, "N is disposed to M when C" entails "if it were the case that C, then N would M", is an account that is incompatible with the fact that, as cases of masking show, something can be disposed to M when C, and yet can fail to M even though C. To make the point vivid, consider just one more example. Suppose I have a kazoo which, like all kazoos, is disposed to buzz when blown through. And let's stipulate that when I blow through my kazoo it will remain intrinsically unchanged. Then provided the kazoo retains its disposition while I blow through it—which it must if dispositions are intrinsic—then if Lewis's account were correct it would follow *as a matter of logic*[12] that the kazoo will buzz. But this is absurd. It is perfectly easy, not logically impossible, for me to stuff the kazoo full of paper (thereby changing it only extrinsically)[13] and blow through it without its buzzing.

How might the defender of a conditional account respond to the problem of masking? There seem to be only four strategies available. One strategy is to add a further sophistication to the conditional account, a sophistication ensuring that disposition ascriptions entail their corresponding conditionals only in the absence of masking situations. A second strategy is to argue that the conditional analysans, once appropriately understood, is true even in cases of masking, and so the problem of masking is illusory. A third strategy is to offer a conditional account which employs some special kind of

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conditional, crucially one for which *modus ponens* is not a truth-preserving rule of inference. The fourth strategy, finally, is to accept that the conditional analysans is false in cases of masking, but to hold that, our intuitions notwithstanding, the corresponding disposition ascription is also false. I want to argue that none of these strategies is viable. My conclusion in this section will therefore be that, given the fact that dispositions can be masked, conditional accounts of disposition ascriptions should be abandoned.

3.1. Solving the problem of masking: Explicit Exclusion

Just as Lewis appealed to the intrinsicness of dispositions to accommodate Martin's examples involving electro-finks, perhaps an additional clause could be added to the conditional account which excludes cases of masking from consideration when evaluating a disposition ascription. We might say, for example, that the cup is disposed to break when struck only if it would break if it were struck *in conditions R*, where conditions of being protected by a support structure are among the conditions excluded by *R*.[14]

The difficulty facing such an approach should be clear: how are these conditions *R* to be specified? The ways in which a disposition may be masked are indefinitely variable. Consider, for example, the kazoo's disposition to buzz when blown through. As I remarked above, this disposition can be masked by stuffing the kazoo full of paper. It can also be masked by coating the kazoo's vibrating reed with wax; or by putting one's finger over the end of the kazoo; or by submerging the end of the kazoo in honey; or .... Given any finite list of potential maskers for the kazoo's disposition to buzz when blown through, it seems that a masking situation not on that list could always be imagined. And even if this were not so—even if there were only finitely many potential maskers for a kazoo's disposition to buzz when blown through—the conditional account is supposed to be a *general* account of their truth conditions. It is implausible to propose a different finite list of excluding conditions for each different disposition that may be ascribed.

The indefinite variability of the ways in which dispositions may be masked also suggests that the excluding conditions *R* cannot be specified by reference to some general property that cases of masking have in common with each other.[15] For it seems that the only relevant property that cases of masking have in common with each other is that they *are* cases of masking. Yet we should not say, for example, that the cup is disposed to break when struck only if it would break if it were struck *in non-masking conditions*. For a "non-masking condition" is just a condition in which the cup *would* break if it were struck, and so our conditional has been trivialized: the cup is disposed to break when struck only if it would break if it were struck in conditions in which it breaks if struck.

One philosopher who defends an explicitly restricted conditional account of disposition ascriptions in the face of this objection is Stephen Mumford.

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In response to the problem of masking, Mumford argues that we should accept:

> If *N* is disposed to *M* when *C*, then if *N* were in *ideal* conditions, *N* would *M* if it were the case that *C*.[16]

Mumford claims that this account is not vacuous. Independently of the notion of masking, Mumford maintains, we have a fairly clear idea of what it is for conditions to be ideal for one purpose or another. When we're considering a piece of wood's disposition to burn when heated, for example, the ideal conditions are those in which there is sufficient oxygen, the wood isn't wet, and so on. Or conditions ideal with respect to a sugar-cube's disposition to dissolve when put in water are conditions in which the water isn't saturated, the temperature isn't too high or too low, and so on.

It is not clear that Mumford's proposal succeeds in avoiding the trivializing objection, the objection that the restriction to certain conditions—ideal conditions in the present case—can be fully specified only by appeal to the notion of masking. For how are we to understand the "and so on"s of the above examples? Their presence is essential: it isn't enough to say that the ideal conditions for the sugar-cube are *just* those in which the water isn't saturated and the temperature isn't too high or too low. For if the pressure were too low, the sugar-cube wouldn't dissolve if it were put in water—yet it would still be *disposed* to dissolve when put in water.

I don't want to press this objection too far, however. Mumford may have in mind the thought that we don't *need* to say anything about exactly which conditions count as ideal conditions.[17] We do have an intuitive (if somewhat unclear) grasp of what kinds of conditions are ideal with respect to sugar-cubes dissolving in water, and perhaps it is reasonable to appeal to this intuitive grasp when giving an account of disposition ascriptions. A philosophical account of what it is for conditions to be ideal would be a welcome addition, but perhaps we should not demand such an account as a condition on the adequacy of an account of disposition ascriptions.[18]

But even the ordinary, intuitive understanding of "ideal" seems to be one according to which the ideal conditions with respect to an object's disposition to *M* when *C* are just those conditions in which the object would *M* were it the case that *C*. The ideal conditions for a disposition are surely those conditions most conducive to its being manifested should its conditions of manifestation obtain. How could some conditions be *ideal* with respect to a certain end if there were other conditions that were *more* conducive to that end? Ideality doesn't leave room for improvement in this way. We can put the point as follows: if a sugar-cube were submerged in water in some conditions *R*, and yet failed to dissolve, then those conditions *R* can't have been ideal with respect to the sugar-cube's disposition to dissolve when put in water—something interfered with the manifestation of

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that disposition, and if conditions had been *ideal* then there wouldn't have been any interference.

On this understanding of "ideal", which I think is just the everyday, intuitive understanding, Mumford's proposal is once again open to the trivializing objection. For on this understanding the ideal conditions with respect to an object's disposition to M when C are just those conditions in which it would M were it the case that C—just those conditions, that is, in which the disposition is not being masked. Mumford's proposal therefore amounts to the trivial claim that

> If N is disposed to M when C, then if N were in ideal conditions (namely, conditions in which N would M if it were the case that C) then N would M if it were the case that C.

Similar remarks will apply to variants of Mumford's proposal which involve an appeal, instead of to *ideal* conditions, to *normal* or *suitable* or *typical* conditions. With respect to a particular ascription of a disposition, these conditions are, intuitively, just the conditions in which the disposition in question is not masked. But conditions in which a disposition is not masked are just conditions in which an object has the disposition and in which the corresponding conditional is true. On pain of trivialization, therefore, any attempt to save a conditional account of disposition ascriptions from the problem of masking by adding an explicit clause which excludes masking conditions must do more than appeal to a notion of ideality, normality or the like—since, in the case of disposition ascriptions, these notions do no more than signal an absence of masking.

3.2. Solving the problem of masking: Contextual Restriction

I want to turn now to the second strategy for rescuing conditional accounts from the problem of masking. According to this strategy, the exclusion of unsuitable circumstances need not be provided by an extra clause in the conditional account, since it comes for free as part of an ordinary understanding of the conditionals used in that account. To keep the discussion manageable, I will pretend that the account being defended is the *simple* conditional account. Since masking appears to raise a problem for any account according to which disposition ascriptions entail their corresponding conditionals, nothing in my arguments will turn on this simplifying pretence.

Suppose I'm teaching a class, and some of my students are worried about failing an upcoming exam. To reassure them, I utter

(1) Every student will pass the exam.

Intuitively, for what I say to be true it is sufficient that each student in my class passes the exam; it is not required that every student in the world

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passes it. It appears that the domain of the quantifier associated with the determiner phrase "every student" is somehow being restricted by the context in which I utter (1), counting as relevant for the truth of my utterance only the students in my class. The fact that there are plenty of students outside my class who won't even sit the exam, let alone pass it, seems compatible with the truth of the proposition expressed by my utterance.[19]

Perhaps we should say something similar when interpreting the conditional account of disposition ascriptions. Consider an utterance of

(2) The barrel is disposed to roll when pushed,

which, according to the conditional account, has the truth conditions of

(3) If the barrel were pushed it would roll.

The problem of masking is that, by wedging a brick under the barrel, it seems that we can make (3) false without affecting the truth of (2), and so the two sentences cannot have the same truth conditions. The response to be considered now is that there is an implicit contextual restriction of the kinds of circumstances in which the barrel is pushed, a restriction which makes circumstances of being pushed while parked by a brick irrelevant to the truth of the conditional (3). Just as the truth of my utterance of (1) does not require every student *in the world* to pass the exam, so, according to the present response, the truth of (3) in the context of giving an account of (2) does not require that the barrel would roll if pushed *under any circumstances*; it requires only that it would roll if pushed under *suitable* circumstances, where which circumstances count as suitable is somehow determined by context. According to this view, context prevents the problem of masking from ever arising.

There are several problems attendant to this response. One is a problem about implementation. *How* does context determine which circumstances of pushing count as suitable? This kind of question, of course, could be asked about almost any appeal to context-dependence to explain a semantic phenomenon, perhaps with the exception of the context-dependence of indexical pronouns. In the case of quantifier domain restriction, for example, how is it determined that just *these* students, the ones in my class, constitute the domain of quantification in (1)? But the question seems particularly acute when asked of the alleged context-dependence of the conditionals used in an account of disposition ascriptions. For in order for the problem of masking to be solved, among the circumstances of pushing that must be counted as suitable with respect to the conditional (3) are circumstances so wide-ranging and dissimilar that it is hard to see how they *could* all be counted as suitable by context. In the case of (1) there is a pretheoretic sense that the students in my class are more salient than any

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other group of students, and it is plausible to think that, in general, context selects the most salient group of objects to serve as the domain of quantification. Yet there are innumerable ways in which a disposition's conditions of manifestation might obtain, none of which needs be in any way salient.

A second difficulty with the present response to the problem of masking is a methodological one. The conditional account is supposed to be a philosophical account of the truth conditions of disposition ascriptions. It is reasonable to require that, in giving such an account, any implicit dependence on context is made explicit. Philosophical prose, unlike everyday conversation, has exacting standards, standards which allow the reader reasonably to assume that any appeal to context, if present, is clearly flagged and explained. Imagine a philosopher who, enamoured of a view sometimes attributed to Thales, tried to defend the claim that everything is water. If it were pointed out to this philosopher that the view is false since Stone Henge is something which isn't water, it would be absurd for the philosopher to reply: "No, no! That doesn't count! You're forgetting about context-dependence. When I used the word 'everything' in stating my view, context ensured that I was quantifying only over things that are water." Instead, the philosopher would be required, in the face of the objection, to make the intended appeal to context explicit, in this case presumably yielding the trivial view that everything that is water is water. Similar standards should be in force for conditional accounts of disposition ascriptions.

These two complaints about the present response are related. The first complaint was that there seems to be no way of accounting for the alleged contextual restriction of circumstances in the conditionals that are supposed to state the truth conditions of disposition ascriptions. The second complaint was that this contextual restriction, if present, *must* be accounted for. Together, these complaints amount to the charge that the appeal to context-dependence to save the conditional account from the problem of masking is no more successful than the previous strategy of adding an explicit clause to that account. What the conditional account of disposition ascriptions needs is a characterization of the kinds of circumstances—circumstances of masking—that count as irrelevant to the truth of a disposition ascription. Maybe it is context that excludes these irrelevant circumstances; but we still need an account of which circumstances those are. The bare statement that "context does the job" is inadequate.

3.3. Solving the problem of masking: Funny Conditionals

Recall that one way of bringing out the problem of masking was to argue as follows:

> *Modus ponens* is a truth-preserving rule of inference for conditionals. So if ascriptions of dispositions entail their corresponding conditionals

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> then whenever an object with a disposition is in that disposition's circumstances of manifestation, the manifestation must occur. But that's not right, since there are plenty of cases in which (*i*) an object has some disposition, (*ii*) that disposition's circumstances of manifestation obtain, and yet (*iii*) the manifestation itself fails to occur. Disposition ascriptions, therefore, do not entail their corresponding conditionals.

This argument is only as compelling as its first premise, the premise that *modus ponens* is a truth-preserving rule of inference for conditionals. In this section we will consider a response to the problem of masking that proceeds by denying this premise. The premise may be denied in one of two ways, a bold way and a cautious way. The bold way of denying the premise is to claim that *modus ponens* is not truth-preserving for the counterfactuals used in the conditional account of disposition ascriptions. The cautious way of denying the premise is to modify the conditional account by replacing those counterfactuals by conditionals of a special kind, conditionals for which *modus ponens* is not valid.

The bold way of denying the premise is too bold to be taken very seriously. Notice that it would not be enough just to produce some isolated case in which a counterfactual conditional and its antecedent are true while its consequent is false. Rather, for the problem of masking to be solved in this way, it would have to be shown that the failure of *modus ponens* for counterfactuals is a quite general occurrence. Among other things, it would have to be shown, for example, that the conditional "If this barrel were pushed then it would roll" can be true even while someone is pushing the barrel and it's not rolling. But how could that be shown? Anyone who thought that this conditional was true in such a circumstance would simply have failed to understand the conditional.

I will focus, then, on the cautious way of denying the premise that *modus ponens* is a truth-preserving rule of inference for conditionals. In particular, I will concentrate on a view defended by Michael Morreau, the view that disposition ascriptions entail what he calls *fainthearted conditionals*, conditional constructions which, although in many ways similar to counterfactuals, do not in general license applications of *modus ponens* (Morreau 1997).

According to the simple conditional account, disposition ascriptions entail their corresponding counterfactual conditionals. Using the symbol "$\Box\!\!\rightarrow$" to stand for the counterfactual conditional connective, the simple conditional account has it that

> N is disposed to M when C only if ($C \Box\!\!\rightarrow N\ M$s).

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On Morreau's account, in contrast, disposition ascriptions entail their corresponding fainthearted conditionals:

> N is disposed to M when C only if ($C \mapsto N$ Ms),

where "$\mapsto$" stands for the fainthearted conditional connective.

How are we supposed to interpret this new connective $\mapsto$? Morreau offers both an intuitive gloss and a formal interpretation. According to the intuitive gloss, fainthearted conditionals have built into them a restriction to some implicit condition. For example, the fainthearted conditional

> The wood is heated thoroughly $\mapsto$ the wood burns

is taken to mean something like

> If it is heated thoroughly, then provided conditions are suitable the wood will burn,

or, alternatively,

> If it is heated thoroughly, then provided circumstances are normal the wood will burn.

What is it for conditions to be suitable or for circumstances to be normal? Morreau is sensitive to the difficulty of this question, and in particular he agrees that such qualifications "suggest that exceptions are open ended and cannot exhaustively be listed" (p. 187). His proposal is that which conditions count as suitable or normal is something that is determined by the context of use (both linguistic and extralinguistic) of a fainthearted conditional. Morreau points out that conditions are not suitable or normal *simpliciter*, but instead are suitable for a given end, or normal in a certain regard—and which ends or regards are relevant will vary from occasion to occasion.

Morreau is surely right on this point. If we are discussing the burning of wood, for example, then only in abnormal circumstances will oxygen be absent. But if we're talking about surface atmospheres of planets, then it is the *presence* of oxygen that will count as abnormal. And if it is granted that which circumstances are normal or abnormal varies in this way from one context to another, then Morreau is also right in saying that a disposition ascription "N is disposed to M when C" entails a qualified conditional of the form

> If it were the case that C, and if circumstances were normal, then N would M.

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For a circumstance is normal with regard to some disposition only if it is not a circumstance in which that disposition is being masked—that much is trivial. But then, without any more being said about what it is for a circumstance to be normal, any view according to which disposition ascriptions entail their corresponding conditionals restricted to normal circumstances is likewise trivial, and will be of no help when it comes to giving an informative statement of the truth conditions of disposition ascriptions.[20]

So if Morreau's view that disposition ascriptions entail their corresponding fainthearted conditionals is to be instructive, something more must be said about fainthearted conditionals. All by itself, the intuitive gloss that fainthearted conditionals are equivalent to counterfactuals restricted to normal circumstances is hardly sufficient. It is presumably partly for this reason that Morreau takes the trouble to give a formal interpretation of fainthearted conditionals. As he says, having such an interpretation "makes the discussion more concrete, enabling examples to be analyzed with rigor" (p. 192).

Morreau's interpretation consists in a fairly detailed and sophisticated possible worlds semantics, providing a formal account of the truth conditions of fainthearted conditionals. According to this interpretation, models for fainthearted conditionals come equipped with a *proviso function*, which maps triples of possible worlds, propositions and abstract objects onto propositions. The value of this proviso function in a given context will be the proposition giving the implicit restriction in a fainthearted conditional, the proposition that "conditions are suitable" or "circumstances are normal". Given this proviso function, as well as a three-place relation of comparative similarity among worlds, Morreau delivers the truth conditions of fainthearted conditionals.[21]

The complexity of Morreau's semantics, however, is entirely unnecessary. For given a standard possible worlds semantics for counterfactuals,[22] Morreau's truth conditions can be stated succinctly:

"$A \mapsto B$" is true at w iff "$(A \wedge P_r) \mathrel{\Box\!\!\rightarrow} B$" is true at w,

where P_r is the implicit value of the proviso function, the proposition that circumstances are normal in regard to r. So the problem of how to interpret the fainthearted conditional connective $\mapsto$ has not been in any way advanced by Morreau's formal machinery. The proposal that disposition ascriptions entail their corresponding fainthearted conditionals is really no more informative than the proposal that they entail counterfactuals explicitly restricted to "suitable" or "normal" circumstances; and we have already seen that this is not much of a proposal at all. Morreau's account

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still leaves us with the now familiar question: How, given a conditional account of disposition ascriptions, can cases of masking be characterized and excluded in a non-trivial way?[23]

3.4. Solving the problem of masking: Implicature

We come now to the last kind of response that may be given to the problem that cases of masking raise for conditional accounts of disposition ascriptions. According to this response, the conditionals used by these accounts literally are as they seem to be: straightforward counterfactuals without any implicit restrictions supplied by context or by anything else. As a consequence, this response contends, cases of masking are indeed ones in which the conditionals associated with disposition ascriptions are false. What this shows, however, is that the disposition ascriptions *themselves* are false in such cases. If a barrel is parked by a brick then (according to the present response) that barrel is not disposed to roll when pushed, our apparent intuitions to the contrary notwithstanding.

Such a view might appear *ad hoc*, a desperate attempt to cling to a conditional account in the face of evident counterexamples. But I think it can be given some independent motivation. Consider what it means to say that the barrel is disposed to roll when pushed. We shouldn't think that this ascription involves some restriction to suitable pushings, so that it means that the barrel is disposed to roll when pushed in suitable circumstances. Instead, it might be thought, "The barrel is disposed to roll when pushed" literally means "The barrel is disposed to roll when pushed *in any circumstances whatever*." And being disposed to roll when pushed in any circumstances whatever requires being disposed to roll when pushed while parked by a brick. No barrel has *that* disposition; *a fortiori*, no barrel is disposed to roll when pushed. In general, the proposal is that we should accept a radical conditional account of disposition ascriptions:

> *N* is disposed to *M* when *C* (in any conditions whatever) iff (in any conditions whatever) if *C* then *N M*s,

where the parenthetical qualifiers, essential to the proposal, are taken to be implicit.

One immediate problem for this view, of course, is its radical nature: How could its seemingly incredible predictions about the truth values of disposition ascriptions be justified? We certainly *take* ourselves to be speaking truly when we say, for example, that (in general) salt is disposed to dissolve when put in water; indeed, we seem to assume the truth of such claims when making predictions about the behaviour of physical objects, predictions which, for the most part, turn out to be correct. How can this be reconciled with the suggestion that almost all our disposition ascriptions are false?[24]

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It can be reconciled by appealing to the pragmatics of disposition ascriptions. The utility of making disposition ascriptions, and the apparent truth of the ascriptions we do make, might be explained by the claim that although they are *literally* false, they are typically used to communicate something true, by carrying true implicatures.[25] What we *express* when we utter the sentence, "The barrel is disposed to roll when pushed," according to this view, is the false proposition that the barrel is disposed to roll when pushed under any circumstances whatever. But what we *communicate* by that utterance is the true proposition that the barrel is disposed to roll when pushed under suitable circumstances, a proposition equivalent to its corresponding conditional.

How should we assess this proposal? It would be a mistake, I think, to argue that the proposal is *wrong*, at least without wielding some substantial theoretical assumptions that it would be inappropriate to appeal to here. For the dispute between this proposal and its rival—an (as yet unseen) account of disposition ascriptions which gives their truth conditions in a way which accords with our pretheoretic judgments about them—is part of a larger, more general dispute about the relation between semantics and pragmatics. Whenever someone gives a semantic theory for some class of sentences (in our case the class of disposition ascriptions), a theory whose predictions about the truth values of the sentences in that class roughly coincide with our independent opinions about those truth values, a rival semantic theory can always be proposed: all the sentences in the class are false, and our mistaken opinions about the truth values of those sentences are the product of our having confused the truth of what is expressed with the truth of what is pragmatically conveyed. In the absence of any other differences between the two theories, to prefer one over the other would be to take a stand on the relation between truth, semantics, pragmatics and speakers' judgments. The prospect of justifying such a stand is a formidable one.

To reject the current proposal as false, then, would be hasty. But we should nevertheless reject it as inadequate for the task at hand, the task of rescuing conditional accounts of disposition ascriptions from the problem of masking. Throughout, I have been interested in the metaphysical question of what it takes for an object to have a disposition, and I have assumed that this question will be answered by giving an account of the truth conditions of disposition ascriptions. If the current proposal is right about those truth conditions, then that assumption is false. If none of our disposition ascriptions is literally true, yet some of them convey something true, then the question of the conditions under which an object has a disposition will be answered by an account of the truth conditions of the propositions *conveyed* by disposition ascriptions, together with an account of which propositions *are* conveyed by them. In short, if the current proposal is right, then we still

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need an account of the *correctness* conditions of utterances of disposition ascriptions.

And the current proposal does not offer us such an account. For the proposal tells us only that the proposition conveyed by an utterance of, say, "The barrel is disposed to roll when pushed," is the proposition that the barrel is disposed to roll when pushed under suitable circumstances. But, once again, which circumstances are the suitable ones? For the conditional account of this proposition to be correct, all cases of masking must be excluded as unsuitable. But how? As before, it is required that cases of masking be excluded as unsuitable *independently* of the fact that they are cases of masking, since to be a case of masking is just to be a case which falsifies a certain conditional, a conditional whose corresponding disposition ascription is true. Until this independent characterization of unsuitable cases has been given, the problem of masking has not been addressed. The current proposal has merely shifted that problem from being a problem for a conditional *semantics* of disposition ascriptions to being a problem for a conditional *pragmatics*. This kind of shift gets us no further forward.

4. The Dispositional Operator

The lesson that should be drawn from the preceding discussion is that conditionals are simply not suited to the task of stating the truth conditions of disposition ascriptions. It is a constitutive feature of conditionals that *modus ponens* is a valid rule of inference for them. Yet what the phenomenon of masking shows is that an analogous rule of inference is *not* valid for disposition ascriptions: from the fact that N is disposed to M when C, together with the fact that C, it does not follow that N Ms. There is an entrenched mismatch between disposition ascriptions and their corresponding conditionals, and, as I have tried to show, this mismatch cannot be patched up by a restriction to "suitable" circumstances, either explicitly or implicitly via context. Moreover, although using a funny kind of conditional, one for which *modus ponens* is not a valid inference rule, would in principle block the problem of masking for conditional accounts of disposition ascriptions, it would also require giving an interpretation for such a conditional independently of the notion of masking, and we have not seen how this could be done.

In light of this, it seems that a more promising approach would be to forget about conditionals, and to try to state the truth conditions of disposition ascriptions in some other way. This is the approach that I will pursue here.

We need not require that the truth conditions of disposition ascriptions be given in a strictly compositional fashion, by deriving them from the semantic values of their constituent expressions together with rules of combination for those values. After all, our interest is in the metaphysical

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question of what, in general, is required for an object to have a disposition, not the question of how speakers come to be competent in ascribing dispositions to objects. Nevertheless, by thinking informally about how such a compositional semantics might proceed, we may be led closer to a correct account.

One of the first steps in giving a compositional semantics for a class of sentences is to identify the constituents, or at least some of the constituents, of those sentences. Syntactically, disposition ascriptions of the form "*N* is disposed to *M* when *C*" seem to belong with sentences like those in (4) below:

(4) *a*. *N* is *disposed* to *M* when *C*.
b. *N* is *reluctant* to *M* when *C*.
c. *N* is *happy* to *M* when *C*.
d. *N* is *able* to *M* when *C*.
e. *N tends* to *M* when *C*.
f. *N wants* to *M* when *C*.
g. *N intends* to *M* when *C*.
h. *N likes* to *M* when *C*.
i. *N* is *expected* to *M* when *C*.
j. *N* is *known* to *M* when *C*.
k. *N* is *required* to *M* when *C*.

Each of the sentences in (4) has at least two immediately identifiable constituents in common with every other sentence in (4): a noun phrase (*N*), and an infinitival complement (*to* M *when* C). Although there are important syntactic differences among the sentences in (4),[26] the existence of a common element, the infinitival complement, recommends the following approach to uncovering the truth conditions of disposition ascriptions. First, we should give a semantic account of "disposed", an account which should explain how the disposition ascription (4*a*) differs from all the other sentences in (4). Second, we should explain what the disposition ascription (4*a*) has in common with the other sentences in (4) by giving an account of the contribution made to these sentences by the infinitival "to *M* when *C*". By thereby resolving the task of stating the truth conditions of disposition ascriptions into two independent components, this task should become more manageable.

Let us begin with the second component, the infinitival clause "to *M* when *C*". A widely accepted principle of syntax is that infinitival clauses must have subjects.[27] When these clauses lack overt subjects at surface form, as in "to *M* when *C*", they should be treated as having covert ones nonetheless. So "*N* is disposed to *M* when *C*" might be informally represented as "*N* is disposed: *S M*s when *C*," where *S* is the implicit subject of the infinitival. Moreover, it appears that the implicit subject *S* is constrained

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to corefer with the main noun phrase *N*.[28] We can use these facts to our advantage. Since our aim here is the modest one of stating the truth conditions of disposition ascriptions, not that of trying to expose their syntactic structure, we may represent the disposition ascription "*N* is disposed to *M* when *C*" as "*N* is disposed: *N M*s when *C*," or, more succinctly, "DISP (*N M*s when *C*)," where DISP is an operator capturing the semantic content of "disposed".[29]

Pursuing this suggestion, the *a*-sentences below should receive the *b*-sentences as their interpretations:

(5) *a*. The sugar is disposed to dissolve when put in water.
b. DISP (The sugar dissolves when put in water).
(6) *a*. John is disposed to eat when he's hungry.
b. DISP (John eats when he's hungry).
(7) *a*. The cup is disposed to break when struck.
b. DISP (The cup breaks when struck).

The task of giving the truth conditions of disposition ascriptions has now been significantly reduced, requiring only an interpretation of the operator DISP. For those truth conditions are stateable as

"*N* is disposed to *M* when *C*" is true iff DISP (*N M*s when *C*).

What about the embedded sentence on the right-hand side of these truth conditions, "*N M*s when *C*"? A crucial feature of these sentences, for our purposes, is that unlike conditionals *modus ponens* does not hold for them. "John eats when he's hungry," for example, can be true consistently with there being recalcitrant situations in which John is hungry but doesn't eat, perhaps because there is no food around, or because John is feeling sick. When we say that John eats when he's hungry we allow that there may be some exceptional occasions in which John, although hungry, doesn't eat. While the conditional "If John were hungry, then he would eat" is falsified by such exceptional situations, sentences of the form "*N M*s when *C*," so-called *habitual* sentences, are not, and they are thus tailor-made for an account of disposition ascriptions, since they can be true even in cases of masking.

It would be a bonus to have a semantics for these sentences, and the project of giving a semantics is one that has received a fair amount of attention in recent work in linguistics.[30] But giving such a semantics should not be regarded as a requirement for the adequacy of the account of disposition ascriptions being offered here. For we are perfectly comfortable with the everyday use of sentences of this kind, and we should be equally comfortable with their use in philosophy. Compare, for example, the conditional account of disposition ascriptions given in terms of counterfactual

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conditionals. That account is intelligible, and can be assessed for correctness, independently of any particular semantics for counterfactuals. Indeed, in arguing against the conditional account in the previous section I never once appealed to a semantics for counterfactuals. The present account of disposition ascriptions should be judged with the same standards. Nevertheless, some brief remarks about the semantics of habitual sentences are in order, if only to draw attention to some of their more important features.

4.1. The semantics of habitual sentences

We should be clear from the start that the label "habitual" is to be taken as just that: a label, not a description. To be a habitual sentence, as I am using the term, is simply to be a sentence of the form "*N Ms* when *C*" (or of the form "*N Ms*," with the "when *C*" omitted—see note 2 above).[31] In spite of the terminology, a habitual sentence need not ascribe a habit to an individual. Each sentence in (8), for example, is a habitual sentence:

(8) *a*. Mary smokes when she gets home from work.
b. Peter sings when he's in the shower.
c. Nadya teaches Bulgarian when she needs money.
d. This rod stays straight when pressure is applied along its axis.

(8*a*) and (8*b*) do indeed seem to require that Mary and Peter have certain habits; but only in a very attenuated sense of "habit" can a corresponding claim be made of (8*c*) and (8*d*).

If the truth of a habitual sentence need not require that its subject have a certain habit, what then *does* it require? A natural suggestion is that habituals have something to do with what is *normally*, or *typically*, or *generally* the case. There seems little if any difference in meaning among the sentences in (9), for example:

(9) *a*. Mary smokes when she gets home from work.
b. Mary normally smokes when she gets home from work.
c. Mary typically smokes when she gets home from work.
d. Mary generally smokes when she gets home from work.[32]

Given this observation, a proposal for the semantics of habituals might be

The Conditional Semantics

"*N Ms* when *C*" is true iff normally, if *C* then *N Ms*,

where the "if... then" connective here is some kind of conditional connective, perhaps material or perhaps counterfactual.[33]

The Conditional Semantics cannot be correct, however, and it will be instructive to see why. The first reason is that, although (9*a*) and (9*b*)

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plausibly have the same truth conditions, one cannot in general add "normally" to the front of a habitual sentence while preserving truth, since sometimes the abnormal can, by unfortunate accident, habitually obtain. A single example suffices to show this:

> The famine has got so bad that even the king eats potato stew when he's hungry. Normally, of course, he dines on fine meat and fish, but as things stand he eats potato stew.

A second reason for rejecting the Conditional Semantics is that it suffers direct counterexamples, even for habituals whose truth survives the prepending of "normally". Suppose I am an extremely busy advertising executive, and my telephone is almost always ringing. Wholly accidentally, however, the very few times when my phone is *not* ringing are just those times when I'm scratching my left ear. So the habitual

(10) My phone rings when I scratch my left ear

is clearly false. The quantified conditional

(11) Normally, if I were to scratch my left ear then my phone would ring,

on the other hand, is *true*. After all, normally my phone is ringing. And normally, it would be ringing no matter what I was doing. Given that there is only an accidental connection between my phone and my left ear, normally my phone would ring whether or not I was scratching, and so, in particular, it would ring if I were scratching my left ear: (11) is true.

According to the Conditional Semantics, the truth conditions for habituals are to be given by a conditional sentence modified by a quantificational adverb, "normally". The two reasons for rejecting these semantics that we've seen show that (*i*) "normally" is (in some cases) the wrong quantificational adverb to use, and (*ii*) conditional sentences are the wrong sort of thing to be modified by whatever the *right* quantificational adverb might be. The Conditional Semantics is therefore untenable.

Some have argued that there can be no semantics for habituals—conditional or otherwise—that locates habituality in a quantificational adverb (see, for example, (Carlson 1980)). Consider the following habitual sentences:

(12) *a*. I drink wine with my evening meals.
b. Alfred builds houses.
c. Mary handles the mail from Antarctica.

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(12*a*) seems to be true only if *most* evening meals of mine are accompanied by wine-drinking; (12*b*) is true provided Alfred has built at least *some* houses (even just one seems sufficient); and (12*c*) can be true even if Mary, working in a low-volume post-office in Hawaii, has in fact handled *no* mail from Antarctica. How could there be a *single* quantifier which when governing some sentences requires mostly true instances to yield a truth, when governing others requires only some true instances, and when governing yet others does not require any true instances at all?

I take this observation to present not a refutation but a *challenge* to those who wish to defend quantificational semantics for habituals. Before returning to dispositions, I will offer a very brief outline of a semantics which takes steps towards meeting this challenge.

A striking feature of habitual sentences is that, although they appear to be generalizations of some kind, they nevertheless tolerate some counterinstances. The truth of "Mary smokes when she gets home from work," for example, is compatible with the existence of occasions on which Mary returns from work but doesn't smoke—perhaps she's out of cigarettes, perhaps she has a sore throat. But of course, habitual sentences don't tolerate just *any* counterinstances, for otherwise they would be contentless. If Mary, home from work, has plenty of cigarettes, is feeling fine, is in the mood to smoke, and if generally all is as it should be, then if she doesn't on such an occasion smoke, it is *false* to say that she smokes when she gets home from work.

These simple observations generate the following outline of a semantics for habitual sentences. Habituals tolerate some, but not all, of their counterinstances. If every counterinstance to a habitual is *acceptable* or *permissible* (in some technical sense to be supplied), then that habitual is true; but if a habitual has an *unacceptable* or *impermissible* counterinstance, then it is false. Given a habitual of the form "*N M*s when *C*," let an *exception* to that habitual be any case in which *C* but in which *N* isn't *M*-ing.[34]

Then the semantics I am proposing is:

The Exception-Tolerating Semantics
A habitual "*N M*s when *C*" is true iff every exception to the habitual is a permissible exception.

In talking here of *every* exception to a habitual, I mean to be including not just actual exceptions but counterfactual exceptions as well, for otherwise the semantics would have absurd consequences. Suppose, for example, that I have an orange-crushing machine and an electric toaster, and consider the pair of sentences:

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(13) This orange-crushing machine crushes oranges when it's switched on.
(14) This electric toaster crushes oranges when it's switched on.

It is clear, I take it, that (13) is true (as long as the machine always has oranges in it) and (14) is false.[35] Suppose further, however, that neither the orange-crusher nor the toaster has ever been switched on, nor will either of them ever be switched on. (13) then remains true and (14) false, even though every *actual* exception to each sentence is a permissible one, for the trivial reason that neither sentence *has* any actual exceptions. Nevertheless, in worlds similar to the actual world in which the machines are switched on from time to time, the orange-crusher crushes oranges on occasions on which it is switched on, while the toaster does not. So (14) has plenty of impermissible counterfactual exceptions, while (intuitively) any counterfactual exception to (13) is a permissible one. So it does seem right to say, as I did, that a habitual is true just in case every exception to it is a permissible exception, provided we count not just actual exceptions but some merely possible ones as well.

Which merely possible exceptions should we include? Not *all* of them, for then we would have that a habitual is true iff every possible exception to it is a permissible exception, which in turn would have the consequence that a habitual sentence is necessarily true if it is true at all (given that which situations are possible is not a contingent matter), which is clearly wrong. Instead, we should consider only those exceptions, if there are any, in the possible worlds closest to the actual world in which the *when*-clause of a habitual is satisfied. Thus according to the interpretation I am proposing, a habitual "*N Ms* when *C*" is true just in case every exception in every *C*-world closest to the actual world is a permissible exception. For most habituals, this will amount to the requirement that every *actual* exception is permissible, since the actual world is the unique closest world to the actual world.[36] But for some habituals, for example (13) and (14) in the examples just described, this inclusion of non-actual exceptions is crucial.

Habituals like (13), whose *when*-clauses are never actually satisfied, deserve special mention for another reason: It is very hard, and in some cases impossible, to hear them expressed by sentences whose main verb is in the simple past tense. Compare, for example, the sentences

(15) *a*. It used to be that this machine crushed oranges when switched on.
b. This machine crushed oranges when it was switched on.

We can hear a habitual reading of (15*a*), true of a machine that used to be an orange-crusher even if it was never switched on. But not so for (15*b*), whose only true reading—a non-habitual reading—is incompatible with the machine's never having been switched on. A complete semantics for

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habituals would deliver an account of the conditions in which a sentence has a habitual reading, and of how the tense (and aspect) of the sentence enter into determining these conditions. Here, however, I am sketching only a modest semantics for habituals, one which gives the truth-conditions for a habitual reading of a sentence when such a reading is available.

Moreover, I have here given only the barest outline of even a modest semantics for habituals. Most importantly, a full statement of the semantics would require an account of what it is for an exception to be permissible.[37] But even with this bare outline, some progress has been made. For if the outline is correct, then we can see that habitual sentences are not just disguised conditionals, and so the account of disposition ascriptions that I am defending is not immediately open to the objections to conditional accounts raised earlier in this paper. Moreover, if the Exception-Tolerating Semantics for habituals is correct, then habituals don't themselves embed disposition ascriptions, and so they are available for use in an informative account of disposition ascriptions.

It may seem to some readers that by refusing to supply a complete semantics for habituals, and in particular by neglecting to explain what it takes for an exception to a habitual to be permissible, I am offering an account of disposition ascriptions that is open to the very objections that I earlier raised against conditional accounts. If I help myself to a notion of *permissibility*, the complaint might run, why is the defender of conditional accounts not entitled to appeal to a notion of *normality* or *ideality* as a way of solving the problem of masking?

This complaint misconstrues the account of disposition ascriptions that I am developing. In particular, the complaint supposes that because I appeal to a notion of permissibility in giving a sketch of the *semantics* for habituals, that notion will likewise be appealed to in any account of disposition ascriptions that is stated in terms of habituals. This is simply not the case. I am offering an account of disposition ascriptions stated in terms of ordinary, non-dispositional sentences of English: habitual sentences. I am *not* offering an account stated in terms of expressions that may appear in a semantics for these ordinary sentences. Consider an analogy. A philosopher might propose (implausibly) an analysis of *similarity* as follows: x is similar to y in respect R iff x and y would evince the same behavior in circumstances sensitive to an object's R-ness. There are plenty of things wrong with this analysis; but it would be inappropriate to complain that the analysis is *circular* on the ground that it uses a counterfactual conditional on the right-hand side, and that a certain semantics for counterfactual conditionals appeals to the notion of similarity. We understand habitual sentences without being explicitly aware of their semantics, just as we understand conditional sentences without being explicitly aware of *their* semantics. So in appealing to the notion of permissibility while sketching the

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semantics for habituals, I am not open to the objections to conditional accounts of disposition ascriptions that appeal, directly, to notions of normality or ideality.

4.2. The semantics of DISP

With some understanding of habituals in hand, let us return to the account of disposition ascriptions that I have been developing. I said above that the truth conditions of disposition ascriptions are stateable as:

"*N* is disposed to *M* when *C*" is true iff DISP (*N M*s when *C*).

How should the operator DISP be interpreted? Notice first that it appears to be factive: DISP(*N M*s when *C*) is true only if *N M*s when *C*. (Note that, crucially, from the fact that *N M*s when *C* it does not follow that there is an occasion on which *N M*s. If this did follow, then the factivity of DISP would imply that all dispositions are manifested at some time, which is surely wrong.) If a barrel is *disposed* to roll when pushed, then it rolls when pushed; if sugar is *disposed* to dissolve when put in water, then it dissolves when put in water. Consider how odd it would sound to assert the denial of an instance of the factivity of DISP. "I'm disposed to pay my taxes late, but I don't pay my taxes late"; "elastic bands are disposed to stretch when pulled, and they don't stretch when pulled." Sentences such as these do not just sound odd, or inappropriate; they sound trivially false, absurd. The factivity of DISP explains this.[38]

What else can be said about DISP? To fix ideas, let us take a particular example. How does "DISP(Tristram trembles when he's angry)" differ from "Tristram trembles when he's angry"? That is, what does the claim that Tristram is *disposed* to tremble when he's angry add to the bare claim that he trembles when he's angry? First, it seems that adding "disposed" serves to rule out accidents of a certain kind. If, by unfortunate coincidence, Tristram happens to be standing near an earthquake each time he's angry, and so is caused to tremble, it would be true to say that he trembles when he's angry, but not that he's disposed to do so. Second, adding "disposed" attributes some kind of responsibility to the subject of the sentence. If Tristram were relentlessly pursued by a fiend with a jack-hammer who began drilling whenever Tristram got angry, then although it would not be accidental that Tristram trembled when he was angry, still we would not say that he was *disposed* to tremble when he was angry. We would say, rather, that the fiend was disposed to make Tristram tremble when he (Tristram) was angry.

When we attribute to an object a disposition to do something, therefore, we are claiming not only that it does that thing, but also that the fact that it does it depends, in some substantial way (although not *entirely*), on how that object is. There is something about the object, and not just about its

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relations to other things, that makes it the case that it behaves in the way it does. To put the point another way: to attribute to an object a disposition to do so-and-so is to say not just that it does so-and-so, but that it has some intrinsic property in virtue of which it does so-and-so. In full, the account of disposition ascriptions that I am proposing is:

The Habitual Account
"*N* is disposed to *M* when *C*" is true iff *N* has an intrinsic property in virtue of which it *M*s when *C*.

5. Benefits of the Habitual Account

The Habitual Account can best be argued for by considering the advantages it has over conditional accounts of disposition ascriptions. First, the Habitual Account seems to make the right predictions about the truth values of the disposition ascriptions that we make. Not only does sugar dissolve when put in water, for example, it also has an intrinsic property in virtue of which this is so; that is why, according to the Habitual Account, it is correct to say that sugar is *disposed* to dissolve when put in water. And I am not disposed to turn to dust when I read the word "abracadabra". Why? Because whatever my intrinsic properties may be, I don't turn to dust when I read that word.

Second, the Habitual Account provides truth conditions for some disposition ascriptions that conditional accounts cannot even accommodate, namely ascriptions of the form "*N* is disposed to *M*," which lack explicit statements of manifestation conditions. I may be disposed to stutter, my drainpipe disposed to leak, and Mr. Magoo disposed to bump into things. Conditional accounts do not even *apply* to such cases, since they contain nothing to serve as antecedents to a conditional.

It would be a mistake to rest too much weight on this second advantage that the Habitual Account has over conditional accounts. For one thing, we would do well to remember that there are plenty of expressions attributing dispositions to objects for which neither a conditional account *nor* the Habitual Account applies—for example the classic dispositional predicates "soluble", "fragile", "flexible". So the fact that there are some more sentences, disposition ascriptions of the form "*N* is disposed to *M*," that only the Habitual Account can handle, should be viewed as at best a moderate advantage of that account.

Moreover, there are a couple of strategies available to defenders of conditional accounts of disposition ascriptions for accommodating ascriptions which lack explicit statements of manifestation conditions. One strategy would be to argue that such disposition ascriptions implicitly contain some kind of existential quantification, so that something of the form "*N* is

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disposed to *M*" should be interpreted as meaning "*N* is disposed to *M* in certain conditions." The trouble with this strategy as stated, however, is that most false disposition ascriptions will wrongly be counted as true. For example, there are *some* conditions (conditions, say, of violent storms) in which even the sturdiest of drainpipes is disposed to leak; but it's not right to say of a sturdy, typically drip-free drainpipe that it's disposed to leak. Perhaps this problem could be avoided by arguing that the implicit quantification is restricted in some way, for example restricted to common or typical conditions;[39] but then problems will arise for dispositions whose nature requires uncommon or atypical conditions for their manifestations, for example my disposition to avoid gunfire.

A second strategy would be to claim that disposition ascriptions which lack explicit statements of manifestation conditions are elliptical for ones that don't lack them, or at any rate they have them contextually supplied somehow. If it's clear that we're discussing the behaviour of plumbing systems during hurricanes, for example, then it may be true to utter "Every drainpipe is disposed to leak," since to utter this sentence would be to say that every drainpipe is disposed to leak when it's stormy. But if we're discussing which of many used pipes to select for our house, it will (hopefully) be false to utter that same sentence, since in *this* context its utterance would be to say that every drainpipe is disposed to leak when it rains. The trouble with this strategy, however, is that we should like to know just how this contextual selection of manifestation conditions is supposed to work. Why is it *these* conditions rather than *those* that are selected in a given context? And what do we say of cases in which there doesn't seem to be enough information in the context to settle which conditions of manifestation are to be supplied? If I say, out of the blue, "This diamond is disposed to cut glass," then there is a presumption, given what we know about diamonds in general, that what I have said is true. But what, in this case, are the implicit conditions of manifestation for the disposition, given that I have said *nothing* about the context in which the disposition ascription is being uttered?[40]

As I said before, however, I don't want to rest too much on this point, the point that conditional accounts are at a loss when it comes to disposition ascriptions of the form "*N* is disposed to *M*." The best reason to prefer the Habitual Account is that it can solve the problem of masking.

Consider a typical masking scenario. A large barrel is perched precariously at the top of a steep hill, and someone is standing ready to push it. Just as they begin to push, however, someone else comes in and leans against the barrel, preventing it from rolling. This seems clearly to be a case in which (*i*) the barrel is disposed to roll when pushed, (*ii*) the barrel is being pushed, and yet (*iii*) the barrel is not rolling, and so it seems

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clearly to be a counterexample to any view according to which the disposition ascription

(16) The barrel is disposed to roll when pushed

entails the conditional

(17) If the barrel were pushed, then it would roll.

The case does not constitute a counterexample to the Habitual Account, however. As we noted earlier, habitual sentences can be true consistently with their having exceptional instances. "John eats when he's hungry," for example, may be true even though there are some occasions on which, perhaps due to illness, coercion or a food shortage, John is hungry but isn't eating. Similarly, the habitual sentence

(18) The barrel rolls when pushed

can be true even though there are some occasions on which, perhaps due to someone's leaning against it, or a brick's being wedged underneath it, the barrel is pushed but doesn't roll. So the habitual sentence (18) is true even in our imagined case of masking. And it's not just true for no reason. On the contrary, there is something about the barrel, perhaps its smoothness, cylindricality and massiveness, that (in part) *explains* why (18) is true, something on which the truth of (18) causally depends. In short, the barrel has some intrinsic feature *in virtue of which* it rolls when pushed. And that is just to say, according to the Habitual Account, that the barrel is disposed to roll when pushed. There is no problem of masking for the Habitual Account of disposition ascriptions.

Consider another case of masking, Johnston's example of the fragile glass cup carefully protected by the packers' support structure. The example is one in which the disposition ascription (19) is true even though the conditional (20) is false, and so is a counterexample to conditional accounts of disposition ascriptions.

(19) The cup is disposed to break when struck.
(20) If the cup were struck, then it would break.

Yet the habitual sentence

(21) The cup breaks when struck

remains true even while the cup is being protected by the support structure. Like all habitual sentences, (21) tolerates some exceptional instances, and the fact that the cup fails to break when it is occasionally struck while

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protected is not sufficient to make (21) false. Once again, therefore, the Habitual Account succeeds in avoiding the problem of masking: the cup has an intrinsic property (weak molecular bonding, say) in virtue of which it breaks when struck—which is just to say, according to that account, that (19) is true.

This last example raises two apparent problems, however, which it will be worth taking time to address. First, there is something strange about sentences like (21). Unlike the bones of live animals, cups break at most once.[41] But it seems that a habitual sentence, as its name would suggest, expresses some kind of habit or regularity of behaviour. How can an object *habitually* do something which it can in fact do only once in its lifetime? How, therefore, can the habitual sentence (21) be true, as it must be since (according to the Habitual Account) it is entailed by the true ascription (19)?

It would be wrong to deny that for the reason just described sentences like (21) are strange, and would typically be avoided by ordinary English speakers. But it would be equally wrong to conclude from this that habituals like (21) are false. Just because using a habitual sentence *suggests* that its subject is capable of repeatedly undergoing the behaviour that it is being said habitually to engage in, we shouldn't think that this is *entailed* by the use of a habitual sentence, any more than we should think that a sentence of the form "Every F is G" entails that something is F on the ground that it is strange to use such a sentence if it is known that nothing is F. As I stressed in section 4.1 above, to be a habitual sentence is *merely* to be a sentence of a certain form.

In fact something stronger than this can be argued. Suppose I am in possession of both a sturdy steel cube and a delicate crystal cup. We have already acknowledged that there is something strange about the habitual sentence

(21) The cup breaks when struck.

But now consider

(22) The steel cube breaks when struck.

(22) is strange in much the way (21) is: like cups, steel cubes break at most once, so it is odd to say of a steel cube that it *habitually* breaks when struck. But while both sentences are strange in this way, (22) is in other ways *far* worse than (21). It's not just *odd* to say of a steel cube that it breaks when struck, it's downright crazy, *clearly false*. Not so to say of a cup that it breaks when struck—that's just a little strange. Moreover, while there are plenty of differences between the steel cube and the crystal cup, surely one difference can be brought out, albeit in a clumsy and unnatural way, by saying that the cup, unlike the cube, breaks when struck. (We can

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imagine a parent telling a child, "Don't practice your hammering skills on the cup, use the cube instead—the cup breaks when it's struck, but the cube doesn't.") If that is right, then we should think that (21) is in fact true, although it would be pragmatically inappropriate to utter it, while (22) is false.

Notice that this difference between (21) and (22) vanishes if these sentences are put into the past tense:

(23) The cup broke when struck.
(24) The steel cube broke when struck.

Neither (23) nor (24) is true. It is important to recognize, however, that this fact has no bearing on the Habitual Account of disposition ascriptions. According to that account, the present-tense disposition ascription, "the cup is disposed to break when struck," entails the present-tense habitual (21). It need not (and does not) follow that *embeddings* of that disposition ascription in various linguistic environments, for example a past-tense environment, entail the corresponding embeddings of the habitual.[42] In general, it is no requirement on an analysis of a sentence that the analsysans and analysandum embed in just the same ways. Consider an obvious (but too often overlooked) example involving a possible-worlds analysis of modal claims. According to this analysis, (25) is equivalent to (26):

(25) I might be juggling spoons now.
(26) There is a possible world in which I am juggling spoons now.

It is no objection to the analysis that (25) and (26) behave entirely differently when embedded, for example, as the consequents of conditionals, witness the falsity of (27) and the truth of (28):

(27) Even if there were no spoons, I might be juggling spoons now.
(28) Even if there were no spoons, there would be a possible world in which I am juggling spoons now.

Similarly, it is no objection to the Habitual Account of disposition ascriptions that there are cases in which (29) is true but (23) is false:

(29) The cup was disposed to break when struck.
(23) The cup broke when struck.

I said there were two problems for the Habitual Account that are raised by Johnston's example of the fragile cup. The second problem emerges once the example is embellished somewhat. As before, imagine that packers have

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carefully protected the delicate glass cup with a support structure, ensuring that situations in which it is struck are ones in which it doesn't break. But imagine also that a scrupulous vandal has got her hands on the cup. The vandal spends weeks hitting the cup with various large objects, attempting to break it. She could, of course, simply remove the packers' structure and easily smash the thing; but that would violate her scruples. Instead, she is intent on getting one up on the packers by smashing the cup while it continues to be protected. Her attempts are in vain, however, and in the end she gives up, frustratedly exclaiming:

(30) The damn cup just doesn't break when struck!

The apparent problem here is that if (30) is a true habitual (which it seems to be), then the sentence

(21) The cup breaks when struck,

which is presumably incompatible with (30), is false. So given that, according to the Habitual Account, disposition ascriptions entail their associated habituals, that account seems to predict that Johnston's cup is not disposed to break when struck.

We should be a little more careful in describing the case, however. The present example brings out a fact about habituals to which I have not yet called attention, namely that they exhibit a measure of context-dependence. To see this, suppose the context is changed. Suppose museum specialists have been spying on the vandal, watching her efforts to smash the cup, efforts culminating in her exasperated utterance of (30). The museum specialists then saunter into the room, and proudly respond:

(31) Oh, but it *does* break when struck; that's why we protected it in the first place. We did such a good job, though, that *you* won't be able to break it.

It seems that their utterance of (31) is true; and given that it embeds (21), their utterance of that sentence must also be true. So we shouldn't just be asking, as we have been until now, whether the sentence (21) is true. We should be asking, instead, whether an *utterance* of that sentence expresses a truth in a given context. And as for (21), so for habitual sentences quite generally.

Recall now the ascription

(19) The cup is disposed to break when struck.

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Since the vandal would speak falsely if she were to utter the habitual (21), the Habitual Account requires that she would also speak falsely if she were to utter (19). On the other hand, the cup does have an intrinsic property—say its weak molecular bonding—in virtue of which, if the *museum specialists* were to utter (21), *they* would speak truly. And so the Habitual Account predicts that they would also speak truly if they were to utter (19).

What does this show? It certainly does not show that according to the Habitual Account Johnston's cup both is and is not disposed to break when struck, any more than Fred's true utterance of "I am happy" and Ted's false utterance of that same sentence show that I am both happy and unhappy. What it shows, rather, is that disposition ascriptions, like the habitual sentences they embed, are context-dependent to a certain extent. The disposition ascription (19) expresses a falsehood in the context of the vandal's utterance of (30), while in the context of the museum specialists' utterance of (31) it expresses a truth. This context-dependence of disposition ascriptions runs in exact parallel to that of the corresponding habitual sentences, and so we have in the Habitual Account an *explanation* of the context-dependence of disposition ascriptions—it is entirely parasitic on that of their embedded habitual sentences.

I want to turn attention, finally, to the other kinds of cases that caused problems for some conditional accounts of disposition ascriptions, namely the cases of so-called "finkish" dispositions. Recall C. B. Martin's example of a rubber wire attached to an "electro-fink," a device which ensured that if the wire were touched by a conductor then it would conduct electricity. Although the wire, being made of rubber, is not disposed to conduct electricity when touched by a conductor, the possession of that disposition is nevertheless "mimicked" by the truth of the corresponding conditional.[43]

These kinds of cases are simply unproblematic for the Habitual Account. Even if the habitual sentence, "The wire conducts electricity when touched by a conductor," is true,[44] it is clearly *not* true in virtue of any of the rubber wire's intrinsic properties. Instead, if the habitual is true at all, it is true in virtue of something *extrinsic* to the wire, namely the electro-fink.

What about Martin's second kind of case, in which we are invited to imagine a wire—this time made of copper, not rubber—which is attached to an electro-fink operating on reverse cycle. This device ensures the falsity of the conditional, "If the wire were touched by a conductor, then it would conduct electricity," by sensing when (if ever) the wire is about to be touched, and quickly changing it into rubber, with the result that the wire doesn't conduct electricity on such occasions. But although this conditional is false, the wire, attached to the fink but untouched by a conductor, seems for all the world like any other copper wire, and so in particular seems disposed to conduct electricity.

But *is* the wire, in Martin's case, so disposed? That depends, I think, on the nature of some details of the case that have not yet been mentioned. In

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particular, we need to distinguish what I will call *transient finkishness* from what I will call *entrenched finkishness*.

The case will be one of transient finkishness if the wire is only temporarily, or rarely, or sporadically attached to the electro-fink. Imagine, for example, that the wire connects two parts of a circuit, and is normally fink-less. Every so often, the wire is touched by a conductor, and (as it should) it conducts electricity on these occasions. From time to time, however, a fink is attached, perhaps so that the wire can be safely cleaned. If on any of these occasions the wire is touched by a conductor, then of course it *doesn't* conduct electricity. Nonetheless, for as long as it's made of copper, the wire is surely *disposed* to conduct electricity when touched by a conductor. Occasional attachments of an electro-fink do not remove this disposition, any more than occasional anoxic conditions remove a piece of wood's disposition to burn when heated.

Notice that just the same holds of the habitual sentence, "The wire conducts electricity when touched by a conductor." For as long as the wire is made of copper, this habitual is true, even if there are occasional attachments of an electro-fink, and even if the wire is occasionally touched by a conductor during one of these attachments.[45] Moreover, there is a *reason* why the habitual sentence is true, namely that the wire *is* made of copper, and so contains a high proportion of free electrons. So the wire has some intrinsic property in virtue of which it conducts electricity when touched by a conductor, and thus the Habitual Account predicts, correctly, that in such a case of transient finkishness the wire has the corresponding disposition.

Not every case of finkishness is transient, however. Imagine that the copper wire, when placed in the circuit, is immediately attached to the fink, perhaps as a safety precaution to ensure that an operator doesn't get electrocuted should the wire be accidentally touched by a conductor; and imagine that steps are taken to ensure that the wire remains attached to the fink at all times. We might say that being attached to the fink is a "way of life" for the wire. This would be a case of *entrenched finkishness*.[46] It seems clear that in such a case the wire would *not* be disposed to conduct electricity when touched by a conductor, in spite of the fact that it is made of copper. Suppose the fink works by (temporarily) turning the wire into rubber if it is touched by a conductor. If being attached to such a device is a way of life for the wire, then it seems absurd to say that the wire is disposed to conduct electricity when touched by a conductor, given that whenever it is touched by a conductor it turns to rubber.

Consider another case of entrenched finkishness.[47] Suppose a sturdy wooden barrel, which we might ordinarily describe as being disposed to roll when pushed, is nailed to the floor of a seafood restaurant, to add to the restaurant's nautical decor. We can imagine that the barrel has been on display in the restaurant for several years, and that it regularly resists the

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attempts of drunken patrons to roll it by pushing. Again it seems clear that this barrel, unlike most others, is *not* disposed to roll when pushed; instead it is disposed to stay perfectly still when pushed, as the unsuccessful attempts of the drunken patrons attest.

I have been suggesting that in cases of entrenched finkishness objects lack the dispositions that they would ordinarily have if the finks were absent, or if their presence were only transient. And this matches perfectly with our judgments about habitual sentences in such cases. If being attached to a fink is a way of life for a copper wire, then the wire doesn't conduct electricity when touched by a conductor—the fink ensures exactly that. Nor does a barrel that's nailed to the floor roll when pushed—instead it just sits there. So once again the Habitual Account of disposition ascriptions makes the right predictions. Whatever the *intrinsic* properties of an object, in a case of entrenched finkishness the *extrinsic* fink ensures that the habitual corresponding to the relevant disposition ascription is false; and so, according to the Habitual Account, that disposition ascription itself is false also.[48]

Notes

[1] This is the view of Stephen Mumford (1998, chptr. 4); Sydney Shoemaker (1980) suggests much the same thing.

[2] I will allow "*C*" to be replaced by sentences whose subjects are (perhaps implicit) pronouns anaphoric on the noun phrase replacing "*N*". So, for example, "The bell is disposed to chime when struck" will count as a disposition ascription, with "*C*" in this instance being replaced by the sentence "(it is) struck." I will also allow the *when*-clause to be omitted altogether, so that (for example) "The door-hinge is disposed to creak" will count as a disposition ascription.

[3] Among the philosophers who have explicitly endorsed this view are Gilbert Ryle (1949), Nelson Goodman (1954) and W. V. Quine (1960).

[4] The "corresponding conditional" of an ascription "*N* is disposed to *M* when *C*" is the sentence "If *C* then *N Ms*."

[5] Martin in fact uses the sentence "the wire is live" instead of "the wire is disposed to conduct electricity when touched by a conductor." I have used this second, canonical disposition ascription so that Martin's counterexamples can properly be counted as counterexamples to the simple conditional account as stated above. Note that, like most disposition ascriptions, the sentence "the wire is disposed to conduct electricity when touched by a conductor" is ambiguous. On one reading, the reading *not* intended here, the ascription is saying that when the wire is touched by a conductor it has a certain disposition: the disposition to conduct electricity. The intended reading makes the quite different claim that the wire has a certain disposition (at the time of the ascription): the disposition to conduct electricity when touched by a conductor. Throughout I intend disposition ascriptions to be disambiguated in this second way. "*N* is disposed to *M* when *C*" should be taken as truth conditionally equivalent to the somewhat clumsy sentence, "Disposed to *M* when *C*, that's what *N* is."

[6] As George Molnar points out, the reverse-cycle electro-fink is no philosopher's invention: some electrical safety devices operate in just this way to prevent people from getting electric shocks (Molnar 1999).

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[7] See, for example, (Smith 1977), (Prior 1985), (Lewis 1997), (Mumford 1998) and (Malzkorn 2000).

[8] See (Lewis 1997). I have simplified Lewis's analysis by (*i*) omitting his reference to time, and (*ii*) using the connective "because" where Lewis uses something of more substance. I do not claim that the simplified version is to be preferred to Lewis's (it is surely not to be preferred); but I do claim that the extra complications of his analysis do not help meet the criticism I am about to give.

[9] See, for example, (Johnston 1992). Alexander Bird has used similar cases, involving what he calls "antidotes" to dispositions, in arguing against conditional accounts of disposition ascriptions. See (Bird 1998).

[10] In supposing that the substance undergoes no intrinsic change during ingestion, I am imagining that it is no ordinary poison, if indeed it is a poison at all. But this doesn't matter. We can imagine that the substance is an electronic death-causer, which works by attaching itself to the stomach wall and vibrating vigorously. The antidote is another mechanism which works by preventing the vibrations from being harmful.

[11] I discuss alternative conditional accounts below.

[12] As a matter of the logic of conditionals, that is.

[13] Note that to put an object in something's cavity, and so to change the *insides* of the thing, is not always to change it intrinsically. Two boats, for example, might be intrinsically just alike even if only one of them is carrying passengers.

[14] See, for example, (Mellor 2000).

[15] C. B. Martin (1994, p. 6) stresses a similar point about attempts to respond to his examples involving finks.

[16] See (Mumford 1998, chptr. 4).

[17] Mumford would presumably add that which conditions count as ideal is to be settled in part by the context of a given disposition ascription. See his pp. 89–90.

[18] D. H. Mellor (2000, p. 763) seems to have a similar sentiment.

[19] There are a number of ways in which these appearances can be bolstered by argument, in the form of theories of quantifier domain restriction. See (Stanley & Szabó 2000) for a survey of possible such theories and a defence of a particular one. Note that according to some of these theories appearances are misleading: my utterance of (1) is in fact false. See, for example, (Bach 1994) and (Bach 2000).

[20] Compare the objection to explicitly restricted conditional accounts given in section 3.1 above.

[21] See (Morreau 1997, p. 199).

[22] That given in (Stalnaker 1968).

[23] I should mention that although Morreau, with his semantics for fainthearted conditionals, does not give an adequate answer to this question, doing so is not his primary goal. He is concerned instead to draw a distinction between reasonable and unreasonable expectations *in terms of* fainthearted conditionals. As Morreau points out, the success or failure of *this* project is independent of the semantics for fainthearted conditionals.

[24] I say "almost all" for two reasons. First, it is compatible with the view being considered here that attributions of dispositions which use simple dispositional predicates like "fragile" or "soluble" are typically true. Second, there may be some canonical disposition ascriptions for which no masking cases can arise. An example, perhaps, is "This rock is disposed to retain constant velocity when no force is exerted on it."

[25] In the sense of (Grice 1989).

[26] The italicized phrases in (4*b*) to (4*d*) are adjectives, and *disposed* plausibly belongs in this group too; in (4*e*) to (4*h*) the italicized phrases are active verbs; in (4*i*) to (4*k*) they are passivised verbs.

[27] I am thus assuming, for example with (Chomsky 1982) and (Higginbotham 1992), that infinitival complements are syntactically clausal, as opposed to (say) verbal.

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[28] In jargon: disposition ascriptions form contexts of obligatory control.

[29] In spite of the way I have written it, it is best to think of DISP as a *two-place* operator, attaching to pairs of noun phrases and sentences to yield sentences. Thus when I write "DISP (Jack kisses Jill)," the operator DISP is attaching to the noun phrase "Jack" and the sentence "Jack kisses Jill" to yield the representation of "Jack is disposed to kiss Jill." It is because of the fact that in disposition ascriptions the subject of the infinitival clause must corefer with the external subject that we do not need explicitly to write: "DISP(Jack, Jack kisses Jill)." Notice also that although "Jack kisses Jill" may be truth conditionally equivalent to "Jill is kissed by Jack," "DISP(Jill is kissed by Jack)" is the representation of "Jill is disposed to be kissed by Jack," which is quite different from "Jack is disposed to kiss Jill." So thinking of DISP as a two-place operator allows us to avoid regarding it as hyperintensional. I thank Gilbert Harman for convincing me of this point.

[30] For an excellent and thorough introduction to some of this work, see (Krifka et al. 1995).

[31] I am thus ignoring, among other things, habitual readings of past tense sentences. "Max ate fish for breakfast," for example, seems to have at least two readings: an episodic reading on which it describes a particular dining activity of Max's earlier today; and a habitual reading on which it describes a previous dining routine of Max's (with the implication that this routine has now changed, as in "Max ate fish for breakfast during adolescence, but now he eats eggs"). Note that some past tense sentences don't admit of habitual readings at all; see the discussion later in this section.

[32] This fact is pointed out in (Farkas & Sugioka 1983).

[33] Other versions of the Conditional Semantics will result from substituting "typically" or "generally" for "normally". What I say below will apply equally to such variants.

[34] The word "case" here can be interpreted, if need be, in the semi-technical sense of (Lewis 1975).

[35] Clear, that is, provided I don't tell you anything more about the case. We could imagine a cleverly designed electric toaster that doubled as an orange-crushing machine; our judgments about (14) would be different if we were talking about that kind of toaster.

[36] The notion of comparative closeness of possible worlds that I am appealing to is just that used by Lewis in his semantics for counterfactual conditionals (Lewis 1973).

[37] I offer an account in (Fara 2001, chptr. 4).

[38] Although most uses of disposition ascriptions suggest that DISP is factive, some examples can be imagined which seem to suggest otherwise. Consider: "I'm disposed to hit people when I get angry, but (thanks to the drug treatment I'm on) I don't hit people when I get angry." Such examples, however, should not convince us that DISP is not factive. They may involve cases where, despite initial appearances to the contrary, the disposition ascription is false. (So, in our example, my drug treatment *removes* my previously held disposition to hit people when I get angry.) Or they may involve cases where, despite initial appearances to the contrary, the relevant habitual sentence is true. (So, in our example, it is *true* to say that I hit people when I get angry, even though, thanks to the drugs, there are no occasions on which I am angry and hitting people; compare the example sentence (12*c*) above.)

[39] I thank an anonymous referee for this suggestion.

[40] It may be thought that information about the context in which the disposition ascription is being uttered isn't needed, on the ground that conversational participants are governed by a *rule of accommodation*, according to which any feature of a context which is needed for an utterance to come out true is automatically supplied, if this is at all possible. See (Lewis 1979) for a discussion of this kind of accommodation. But it is hard to see what kinds of constraints could be placed on a rule of accommodation for disposition ascriptions to ensure that obviously false utterances don't come out as true. Suppose that, out of the blue, I utter the sentence, "This banana is disposed to cut glass." Unlike in the case of the diamond, there is a presumption, given what we know about bananas in general, that what I have said is false. But then why aren't we accommodating in this case, selecting some conditions of manifestation that would

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make the disposition ascription true, treating it as expressing the claim (say) that this banana is disposed to cut glass *when it is strengthened with steel, deep frozen, and honed to razor sharpness*?

[41] Glue and other subtleties aside.

[42] This is not to say that the Habitual Account is silent on the question of the truth conditions of "the cup was disposed to break when struck." According to that account, this past-tense ascription is true iff "the cup is disposed to break when struck" was once true; and that was once true only if the habitual (21) was once true.

[43] The expression "mimicking" is due to Mark Johnston. See, for example, (Johnston 1992).

[44] Whether or not this sentence *is* true will depend on how the details of the example get filled out. If the electro-fink were, for whatever reason, attached to the wire only once or twice, then it seems that the habitual sentence would be false. On the other hand, we might imagine that the wire is permanently hooked up to the electro-fink, perhaps housed in a display case at a fairground, labelled "The Amazing Electric Rubber Wire." In this case the wire, although made of rubber, would generally, normally and typically conduct electricity on occasions in which it was touched by a conductor, and so, presumably, the habitual sentence would be true. See the discussion in the text below for more remarks about this kind of phenomenon.

[45] In the terminology of the Exception-Tolerating Semantics for habituals outlined in section 4.1 above, occasional attachments of an electro-fink will count as *permissible exceptions* to the habitual.

[46] Notice that the distinction between entrenched and transient finkishness is not a sharp one. One could easily imagine a case where being attached to a fink was not exactly a "way of life" for the wire, but nor was it only a sporadic or occasional event. This would be a case which was neither clearly entrenched nor clearly transient. I predict that it would also be a case in which the wire was neither clearly disposed to conduct electricity nor clearly not disposed to conduct electricity; and the Habitual Account would make the same prediction.

[47] The following case is perhaps better described as one of entrenched masking, since the "fink" in this case does not work by intrinsically altering the object if the disposition's conditions of manifestation obtain. But the point of the example is independent of this detail.

[48] For helpful comments on previous drafts of this work, I thank Karen Bennett, Kit Fine, Gilbert Harman, Harold Hodes, Mark Johnston, Simon Keller, Gideon Rosen, Kieran Setiya, and two anonymous referees. I also thank participants of my seminar on dispositions given at Cornell in Spring 2002, especially Jamie Hobbs and Sydney Shoemaker. My greatest debt is to Delia Graff, for heaps of discussion, criticism and advice about everything in this paper.

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